

## PREVESICAL ABSCESS.\*

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THE clinical interest of the space of Retzius exists in suppurative disease of that space. A condition first described by Wenzel Gruber in 1862, since then cases have from time to time been reported, appearing chiefly in the French and German literature.

In 1856 the Swedish anatomist Retzius presented to the Academy of Stockholm the first detailed description of this space, indicating at the same time the surgical importance of that region. As described by Retzius the space does not conform with the findings of more recent observers, and not until the publication of Leusser's studies in 1885 have the anatomical relations of this space been defined. Subsequent collaborators, chief among whom are Pinner, Panzatz, Delbet and Waldeyer have in the main corroborated his findings.

The prevesical space is one peculiarly designed for its special function. Its contents are a mass of loosely reticulated connective tissue enclosing masses of soft fat, there are few blood vessels and some lymphatic glands. The boundaries of this space are in part fixed and in part flexible, which together with its soft contents, permits of the distensibility of the bladder. The surgical features of this region are dependent upon the arrangement of the fasciae contributing to its formation.

According to Waldeyer, the posterior rectus sheath terminates several inches above the symphysis, forming the semilunar fold of Douglas. Beneath this level the recti muscles on either side are covered posteriorly only by transversalis fascia.

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\* Read before the Section on Genito-urinary Surgery of the New York Academy of Medicine, January 15, 1908.

The fibres of the recti muscles descend and are inserted on the anterior surface of the symphysis pubis, and the transversalis fascia descends to its insertion on the posterior surface of the same bone. It becomes evident therefore that a space results three cornered in its sagittal section and whose base is equal to the antero-posterior thickness of the os pubis. This space contains loosely woven connective tissue and fat and lodges the deep epigastric artery. This is called by Waldeyer, the prefascial space.

Immediately behind this is a space of greater dimension and representing the true space of Retzius or Cavum Retzii, lying truly speaking retro-mural and prevesical.

Anteriorly is the symphysis pubis and transversalis fascia forming the posterior boundary of the prefascial space.

Posteriorly is a layer of fascia continuous with that covering the floor of the pelvis and stretching over the anterior and lateral walls of the bladder. Usually this space reaches up only to the fold of Douglas but occasionally to the umbilicus.

In its lower part the space is permanently prevesical, lying in front of the bladder even in its collapsed state and behind the symphysis. The lateral limits of this space are bounded on either side by a fold descending from the extremity of the fold of Douglas, these on either side descending as pillars to the symphysis pubis, form portions of the ligaments of Hesselbach. The lowest limits of this space are formed by the reflection of visceral and parietal fasciae upon the floor of the pelvis and immediately overlying the bladder neck, the prostate gland and sometimes part of the posterior urethra. It is of interest to note that both of these spaces are divided by a thin and imperfect median septum.

For the sake of completeness it becomes necessary to mention at this juncture, what has been described as a third space. This is called the preperitoneal space. It contains a thin layer of connective tissue, and lies for the most part on a plane above the bladder. Behind is the peritoneum and in front is a fibrous fasciculus, a continuation of vesical fascia.

Truly speaking this is not a space nor is it of any surgical moment.

The present anatomical conception therefore shows a marked deviation from the original one of Retzius, describing

FIG. 1.

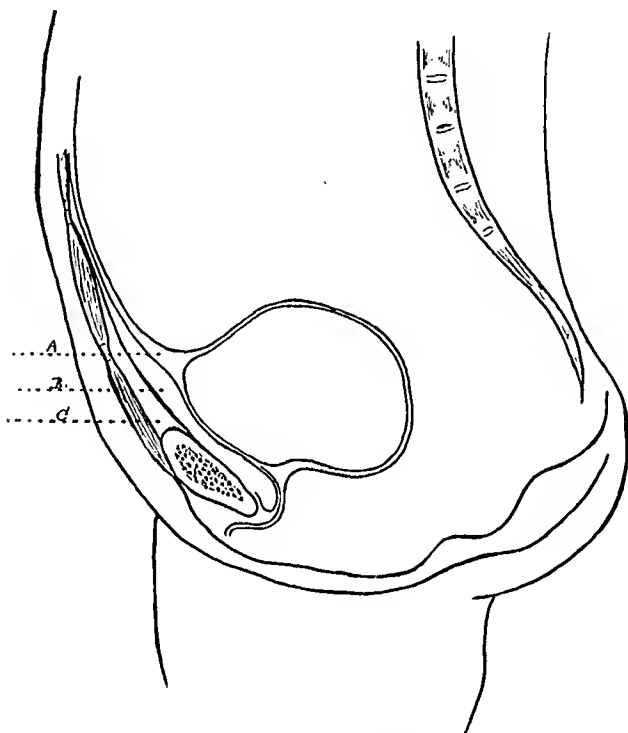


Diagram showing the three spaces constituting the space of Retzius. A, Preperitoneal; B, Prevesical; C, Prefascial.

three spaces instead of one, namely: 1. Prefascial or retro-muscular space. 2. Prevesical space. 3. Preperitoneal space.

This description is not merely academic but finds its practical application both in an intelligent interpretation of the etiology of infections of this region and in their treatment.

Besides fat the prevesical space contains a few lymph glands which have been called anterior vesical lymph glands. These glands were shown by Gerota to drain in part the mucous membrane of the bladder, Cunéo et Marcille having reached similar conclusions. Küttner by a series of injection experiments showed these anterior vesical glands to communicate with the mucous membrane of the posterior urethra.

Twice Bavy found the anterior vesical glands enlarged at operation, one operation having been performed for vesical calculus and cystitis, the other for malignant tumor of the bladder.

The obscure etiology of prevesical infection has led many observers to overlook the initial causes and to consider many of the cases to be idiopathic in origin. Bouilly considers this a large class as does also Martin, Duplay et Reclus, Le Dentu and Delbet. It seems probable however that prevesical supuration is rarely if ever idiopathic. Steinthal believes the class to be small and Leibold, Michels, Hassler and Honsell deny the occurrence of idiopathic abscess in the Cavum Retzii. A strikingly contrary standpoint to that maintained by Englisch, who believed these abscesses to be a disease *sui generis* and due to a peculiar agent having a selective action upon the prevesical connective tissue.

Honsell agrees with Leibold, who maintains that primary abscess in the prevesical space, is in reality broken down hematoma resulting from traumatic causes. Going a step further he states that such hematomata occur in the prefascial space or as he prefers to call it the retro-muscular space, and therefore not truly in the prevesical space at all.

The question of etiology has been discussed by Bouilly, Guyon, Leusser, English and others. Honsell in his very excellent article adopts the classification of Englisch, who divides these infections into four groups, namely: 1. Idiopathic. 2. Traumatic. 3. Metastatic. 4. Secondary. From the foregoing it becomes evident that the groups idiopathic and traumatic fall under the same caption. In fact it would

seem that for all purposes a division into two classes, primary and secondary is all sufficient.

The cases hitherto reported as metastatic all have been post-typhoidal. Honsell believes that inasmuch as typhoidal abscess shows a proclivity to the long muscles of the abdominal wall, such abscesses in great likelihood would occur in the prefascial and not in the prevesical space. If then we chose to be accurate in our terminology both the class names idiopathic and metastatic would fall away. A terminology however which would debar from this classification all abscesses occurring in the prefascial space would serve no good purpose and lead only to confusion.

In this connection must be mentioned Guyon's reported cases of "*Hygrome de la Bourse Sereuse Prévesical*," wherein serous fluid was found in the prevesical space. He suggests the existence of a bursa in this region and of its primary infection as a cause for prevesical abscess.

The large class of cases of infection of the prevesical space from traumatic causes distinguishes a class of its own, which demand recognition in this connection only in order to exclude them from the type of case under discussion. To this class belong all those cases resulting from infections of the prevesical space from external or internal injury, directly or indirectly applied.

Such cases are those resulting from gunshot or stab wounds with or without penetration of the bladder, or fracture of the pelvis. All those cases of traumatic rupture of the bladder or urethra with urinary infiltration, or injury to the bladder or urethra following instrumentation such as lithotripsy or catheterization or infection following supra-pubic section or puncture.

Eliminating therefore those of traumatic origin, a study of the reported cases of prevesical abscess reveals the fact that by far the great majority of cases bear a distinct relation to foregoing inflammation, and must therefor be considered as secondary.

The most prolific cause of suppuration in the prevesical

space is inflammatory conditions of the urethra, prostate and bladder. The primary inflammation may be acute but more often is of an indolent type and likely to be overlooked. Other causes are inflammation of the abdominal wall or sub-peritoneal tissues, suppuration in the pelvic or inguinal lymphatic glands, and osteomyelitis of the os pubis. In the female infection may emanate from diseased internal genital organs, and in children more especially from the intestines.

The following case I am permitted to report through the kindness of Dr. Herman Goldenberg, chief of the Genito-urinary Department of Mount Sinai Hospital. The case is of value because it deserves mention among the list of cases to be mentioned, and furthermore because certain clinical features have been studied which have been neglected in other cases, and which seem to throw much light upon the diagnosis which usually is obscure.

S. C., male aged 20 years, has had the usual diseases of childhood, has neither cardiac, pulmonary nor nephritic disease. He denies syphilis and gonorrhœa, and is habitually constipated. Present illness began suddenly eight days before admission to the hospital with pain referred chiefly to the rectum and a feeling of soreness in the pelvis which could not be defined. The pain became aggravated in the sitting posture. There was no frequency of urination but some burning and difficulty in starting that act. Two days after the onset of these symptoms the patient had to be catheterized for retention of urine, which after two more days again had to be performed. Since that time the patient has been passing urine at frequent intervals with burning pain, and has had some chilly sensations.

At the time of admission the patient presented normally developed genitals, no urethritis nor evidences of any previous attack. The urine was normal. Rectal examination revealed a prostate somewhat enlarged for a youth of his years, and on the right side was a small area distinctly more tender than the rest of the gland. Cystoscopic examination showed the trigone somewhat injected and "in the interval between the urethral orifices were several small ulcers to which some mucus shreds were adherent."

The patient was treated by means of instillations of 2 per cent. nitrate of silver. He remained ten days in the hospital, during this time the temperature and pulse were normal, the burning sensation on micturition disappeared, and considering himself cured asked for his discharge.

Eleven days afterward the patient returned to the hospital with the statement that he remained entirely free from any disturbance for seven days, he then began to have pain in the hypogastrium difficult to localize accurately. At about this time a hard and rather globular mass appeared in the median line and just above the symphysis. During this time there had been little or no constitutional disturbance. Urination was normal, the urine containing neither blood nor pus. In the hypogastrium and just above the symphysis in the median aspect is a tumor resembling much in outline an enormously distended bladder. This tumor extends to about one and a half inches below the umbilicus and to about two inches to either side of the median line. It is hard, very slightly tender and flat upon percussion. The tumor does not vanish upon catheterization, and when examined bimanually the mass is recognized to be anterior to the bladder. The prostate gland is smaller than when the patient was first seen and is no longer tender. There is a moderate leucocytosis, a differential leucocyte count was not made. The temperature fluctuated daily from 99 to 101.4 and the pulse proportionately.

The cystoscopic examination revealed a most intense oedema bulbosum of the entire anterior wall of the bladder with numerous submucous hemorrhages. The trigone was slightly injected, the rest of the bladder was normal.

The patient was treated with Kemps rectal irrigations and later poultices to the hypogastrium. In the course of the following few days, the character of the mass changed somewhat. Its outlines became more diffused and there seemed to be a sense of deep fluctuation. Five days after his second admission the patient was operated upon. A median incision was made over the tumor. Upon a plane just posterior to the recti and corresponding to the prefascial space was encountered a dense firm fibrous structure three quarters of an inch in thickness, giving much the impression of new growth. This extended laterally for some distance and represented inflammatory induration of the transversalis fascia. Only after extending the incision

through this thickened structure was the abscess cavity reached. The abscess was distinctly in the prevesical space and bore no direct communication to any other focus of infection. Bacterial examination showed the presence of staphylococcus aureus. The patient's recovery was uneventful.

I am led to believe that infection in this case emanated from an infectious nidus in the prostate excited by the catheterization and carried by the lymphatics to the anterior vesical lymph glands, which in their turn went on to suppuration and abscess formation.

In conjunction with the foregoing, a review of the cases from the literature is of interest. The cases divide themselves into the following etiological groups: 1. Infection from the urethra and prostate. 2. Direct infection by perforation of the anterior bladder wall. 3. Infection from adenitis in the vicinity. 4. Infection from the female genital organs. 5. Infection from osteomyelitis of the os pubis. 6. Infection from the intestinal tract. 7. Infection emanating directly from the vermiform appendix.

GROUP 1.—*Infection from the urethra and prostate*—as mentioned above this is probably the most prolific cause, and occurring as in the case cited.

CASE 1.—MEIGNANT reports two cases both probably of urethral origin. The second case exemplifies well a condition encountered in several of the cases, namely, "abscess en bisac," or hour glass abscess. The primary abscess occurring in the prevesical space perforates the transversalis fascia and infects the prefascial space. The surgeon encountering this condition is likely to drain only the abscess in the prefascial space, overlooking the more serious condition underlying.

CASE 2.—PARA ET TUFFIER, female, uterus and adnexa normal, point of origin of infection, urethritis and cystitis. The entire lower segment of the abdominal wall from the symphysis to the umbilicus presented a painful board-like intumescence. The condition found was abscess in the prevesical space with intense inflammatory involvement and thickening of fascial structures of the abdominal wall.

CASE 3.—COSTANEDA Y CAMPOS reports case similar to the above, which is, however, of special interest because it ruptured spontaneously.

CASE 4.—HASSLER—Bottini operation performed two years previously. Large hypogastric tumor developed in course of several weeks, which proved to be prevesical abscess. Staphylococcus aureus was found.

CASE 5.—HOTCHKISS—Old stricture of the urethra and vesical calculus. Transversalis fascia, board-like in character and half inch in thickness. Marked inflammatory reaction, with little or no abscess.



GROUP 2. *Cases following perforation of the anterior bladder wall.*—This group of cases is secondary to aggravated cystitis whether that be due to the irritation of calculus or to tuberculosis, and would include cases of direct penetration of infection without apparent perforation. We have seen from the experiments of Gerota the relation of the bladder mucosa to the anterior vesical lymphatics.

CASE 1.—DUPLAY—Old prostatic with ulcerative cystitis, developed painful tumor in hypogastrium. Autopsy showed perforated ulcer of bladder and infection of prevesical space.

CASE 2.—CRISTOL reports case similar to the preceding.

CASE 3.—LEIDOLD—Female, tubercular nephritis and cystitis. Perforating ulcer of anterior of the bladder.

CASE 4.—HEWETT—Female, 9 years, tubercular cystitis, perforating ulcer infecting prevesical space. Spontaneous rupture. Died.

CASE 5.—LAUWERS—Male, 19 years, spontaneous rupture of the anterior abdominal wall. Resulting urinary fistula, calculus removed. Recovery.

GROUP 3. *Infection from adenitis in the vicinity.*

CASE 1.—HONSELL—Man, for years having suffered from various tubercular lesions. Suppurating inguinal glands burrowed behind symphysis and infected prevesical space. Hypogastric tumor developed slowly. Abscess cavity found to contain tubercular granulation tissue.

GROUP 4. *Infection from the female genital organs.*

CASE 1.—MICHELS (third case of series).—Although not positively stated, the infection of the prevesical space probably emanates from a ruptured tubal pregnancy.

GROUP 5. *Infection following osteomyelitis of the os pubis.*—The location of an abscess resulting from osteomyelitis of the os pubis, is determined by the place where the exudate pierces the periosteum. If the periosteum is ruptured in the upper part of the bone, infection will occur in the prefascial or retro-muscular space. If perforation occur in front it will present under the skin, or if below, the planes of least resistance will cause abscess to appear in the scrotum or the labium majus, or in the peri-rectal tissues. If, however, perforation occur upon the posterior surface of the os pubis it

must inevitably lead to infection of the prevesical space. Perforation at this point is least frequent owing to the fact that here the periosteum is re-enforced by the transversalis fascia.

CASE 1.—GRUBER—At autopsy the prevesical space was found the seat of abscess. The prostate gland was normal, but at either side was a channel of communication between the prevesical and ischio-rectal abscesses. On the left side the os pubis for some distance was denuded of its periosteum and the bone was eroded. Whereas the prevesical infection may have emanated from a peri-rectal abscess, I rather believe the infection to have been primary in the os pubis.

CASE 2.—GRENSER—Female, pregnant. Trauma to os pubis followed by fever and later developed hypogastric tumor. Autopsy showed abscess in the prevesical space communicating with large area of caries of pubic bone.

CASE 3.—KIRCHNER—Case of sudden onset in young man 21 years. Symptoms of fever delirium and pain and later the development of a tumor in the hypogastrium. Incision opened an abscess in the prefascial space which led to the os pubis denuded of its periosteum. The symphysis was infected and an epiphysis lay free in the cavity. The sequestrum was removed and recovery ensued.

#### GROUP 6. *Infection emanating from the intestinal tract.*

CASE 1.—MARTIN—Infant, 16 months old. Etiology is obscure though probably of intestinal origin. Prevesical abscess drained and recovery followed.

CASE 2.—MICHEL (second case of series)—Carcinoma of the intestine ulcerating and infecting the prevesical space.

CASE 3.—GUYON—Case similar to the preceding.

#### GROUP 7. *Cases following direct infection from the vermiform appendix.*

These cases would not be out of place in Group 6, but perhaps they deserve a special grouping.

CASE 1.—BRUN—Boy, 9½ years. Was sick for 14 days with symptoms of acute appendicitis. Gradually there developed a painful tumor in the hypogastrium. The urine having been clear suddenly contained foul pus. Autopsy showed an abscess in the prevesical space. The posterior wall of the abscess cavity was formed by the anterior bladder wall and peritoneum. The appendix lost itself in adhesions in the posterior wall of the abscess cavity, its lumen communicating directly with same. A second perforation opened freely into the peritoneal cavity.

CASE 2.—TUFFIER cites a similar case which however recovered after draining the abscess cavity; a fecal fistula persisted, until an intra-

abdominal operation was undertaken. The appendix was found to be the cause. Recovery followed.

Leusser, Englisch, Bouilly, Guyon and Gerardin have attempted to delineate the clinical sequence of this disease, dividing the symptoms into stages. It is apparent that no such periods can occur in a condition dependable upon so many different causes. Nor does any one clinical picture portray its many manifestations.

Bouilly, Leusser and Englisch divide the symptoms into two groups: first, prodromal; second, tumor formation. Hon-sell correctly says, no periods exist, some cases begin with tumors and in others death may supervene before that event. Although most of the cases have occurred in adult life neither infancy nor childhood precludes that condition, one case having occurred at the age of 16 months, and another at 9 years. The condition is more frequent in the male but a fair proportion of the cases have occurred in the female.

In consequence of the fact that infection of the prevesical space is practically always, except in traumatic cases, secondarily invaded, there must precede a group of symptoms referable to that primary lesion. Without entering upon the symptoms of that primary group, whether that be symptoms of cystitis, osteomyelitis or appendicitis, there comes a moment when the prevesical space becomes invaded and from that time on there is a similarity of symptoms. Pain is a prominent symptom, it is not necessarily severe. It is difficult to locate in the milder cases and gives the sensation of pressure or weight in the pelvis. There is some tenderness which becomes marked only with the appearance of the tumor. The patient stoops forward in walking or standing in order to prevent contraction of the abdominal muscles. The tumor may appear early, but in most of the reported cases appeared late. The formation of a tumor in this region rather than a diffuse phlegmon is due to the distribution of dense fasciae preventing the dissemination of inflammatory materials, and as a result of that an enormous thickening of the fibrous

walls of this space. The tumor is usually in the median line, but may be somewhat to one or the other side.

In outline when seen early it is globular and appears above the brim of the pelvis, later its lines become more diffused and at a still later period may no longer be globular, but gives the impression of a board-like hardness to the lower part of the abdominal wall. Fluctuation if it occurs at all appears late and only after the abscess has perforated into the prefascial space, producing an abscess "en bisac" or hour glass abscess. There may be no urinary symptoms unless the bladder becomes secondarily involved. Constitutional symptoms are variable but are usually mild.

The bacteriology of prevesical abscess has not been satisfactorily investigated. In my case the organism was staphylococcus aureus, this organism was found also in one other case in which the bacteriology was studied. In Honsell's case tubercle was found.

The very significant cystoscopic finding in the case described above has led me to believe that this may be an accompaniment of all cases of prevesical suppuration, and therefore a valuable sign in the diagnosis of that condition. I refer not only to the oedema bullosum but also to its limited distribution to the anterior bladder wall.

A remarkable issue of these prevesical inflammatory tumors is their spontaneous resolution. This has frequently been observed. Merkel reports one case in a series of 5, and Cotte, quoting Villiers, mentions this occurrence five times in a series collected by him of 53 cases. Resolution is accompanied by subsidence of fever pain and the gradual disappearance of the tumor. The usual termination, however, is by suppuration which if not relieved by incision ruptures spontaneously. A most unfortunate termination is by perforation into the peritoneal cavity, an event which has been observed 10 times. Spontaneous rupture externally usually occurs in the median line and occasionally by multiple perforation. Rupture into the bladder and rectum has also been observed.

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